

# Angina

↓ myocardial blood + ↓ O<sub>2</sub> supply → myocardial ischemia → chest pain

## causes

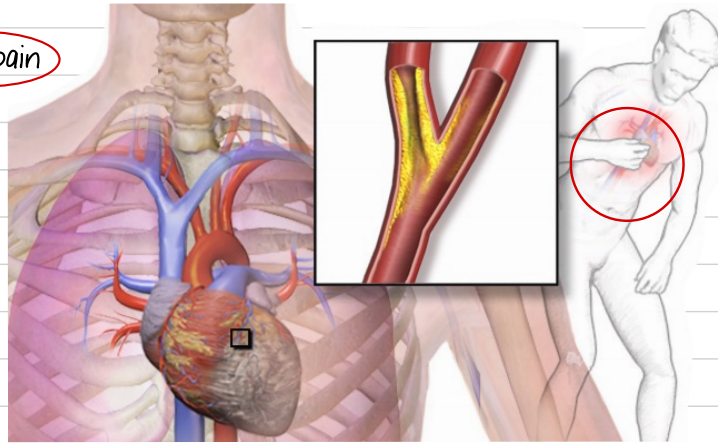
- atherosclerosis
- Coronary artery spasms
- Conditions that ↑ myocardial O<sub>2</sub> consumption (fever, anemia, infections)

## goal

- provide relief of acute attack
- correct myocardial O<sub>2</sub> supply + demand imbalance
- prevent disease progression
- prevent future attacks → ↓ risk of MI

### treatment

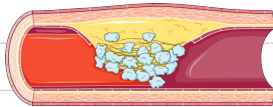
1. pain relief
2. improve O<sub>2</sub> by opening blood vessels
3. ↓ HR if tachycardic



## ↓ O<sub>2</sub> supply

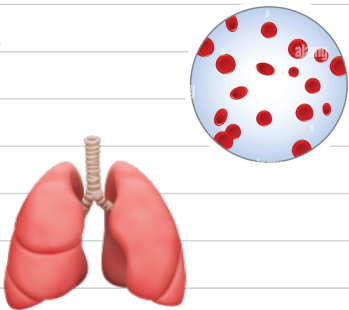
### cardiac:

- coronary artery atherosclerosis
- coronary artery spasm
- coronary artery thrombosis
- dysrhythmias
- heart failure
- valve disorders



### noncardiac:

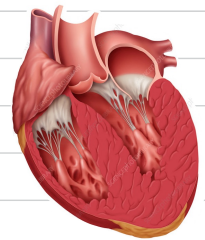
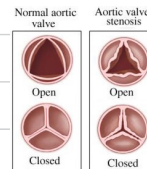
- anemia
  - asthma
  - COPD
  - hypovolemia
  - hypoxemia
  - pneumonia
  - substance abuse
- (stimulants: cocaine, amphetamines)



## ↑ O<sub>2</sub> demand / consumption

### cardiac:

- aortic stenosis
- cardiomyopathy
- dysrhythmias
- L ventricular hypertrophy
- tachycardia



### noncardiac:

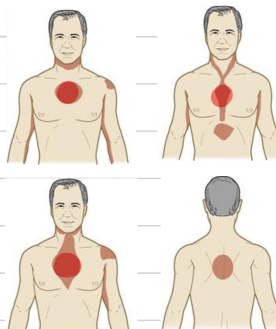
- anxiety
  - hypertension
  - hyperthermia (fever, infections)
  - hyperthyroidism
  - physical exertion
  - substance abuse
- (stimulants: cocaine, amphetamines)



## manifestations

### • chest pain \*

- substernal, crushing, squeezing pain
- can radiate → shoulders, arms, neck, jaw, back
- <5min or up to 15-20 min
- relieved by nitroglycerin or rest



- dyspnea
- pallor
- sweating
- palpitations
- tachycardia
- dizziness
- faintness
- HTN (↑BP)
- digestive disturbances



(older adults 70-80yrs: stomach pain → pass out)

# Types of angina

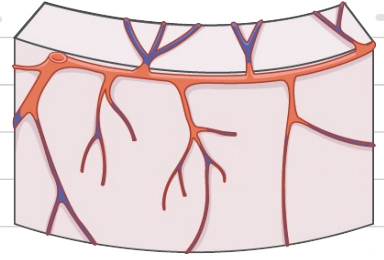
## chronic stable angina

### etiology:

O<sub>2</sub> supply/demand mismatch → myocardial ischemia (usually secondary to CAD)

### characteristics:

- predictable
- occurs w/exertion or stress
- episodic pain lasts few minutes
- relieved by nitroglycerin or rest

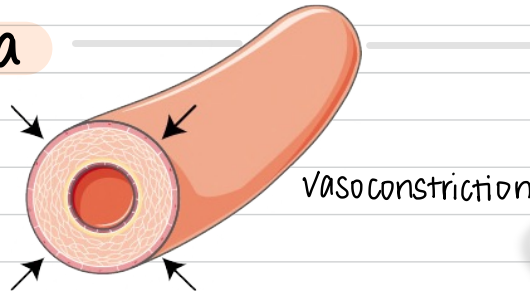


↓ blood flow  
↓  
can lead to ACS

## Prinzmetal's angina

### etiology:

coronary vasospasm



### characteristics:

- occurs at rest
- triggered by smoking + substances (histamine, epinephrine, cocaine)
- in presence or absence of CAD



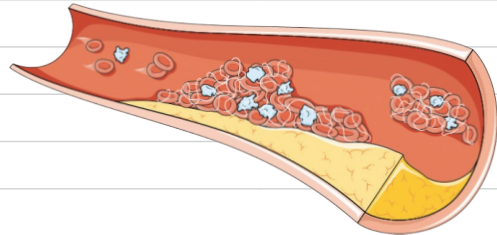
## Unstable angina

### etiology:

rupture of unstable plaque → exposes thrombogenic surface

### characteristics:

- new, onset angina
- Chronic stable angina that ↑ frequency, duration, + severity
- occurs at rest or w/ minimal exertion
- lasts > 10 min
- won't go away w/rest
- potential to completely occlude the artery



### ACS:

previously stable  
plaque ruptures



releasing  
substances



platelet aggregation +  
thrombus formation



can lead to MI

# Drug therapy

## ① short acting nitrates

### use:

- to relieve current, acute, mild chest pain
- ★ • first line treatment of angina
- prophylaxis: taken 5-10 min before starting an activity that is known to cause angina (ex: exercise)

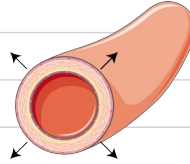
### mechanisms:

1. dilating peripheral blood vessels
2. dilating coronary arteries + collateral vessels

### medications:

- sublingual nitroglycerin
- translingual spray

onset 5 min  
duration: 30-40 min



## ② long acting nitrates

### use:

- to prevent future episodes of angina
- ↓ frequency of angina attacks
- treat Prinzmetal's angina

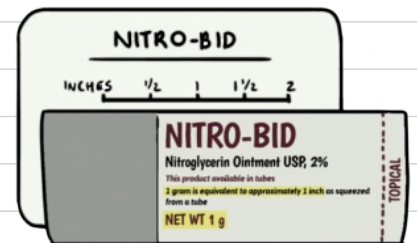
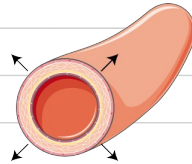
### mechanisms:

- vasodilation (not immediate)

### medications:

- isosorbide dinitrate (Isodril) PO
- isosorbide mononitrate PO
- nitroglycerin ointment
  - Nitropaste: 2% NGT ointment
  - dosed by the inch
  - placed on upper body or arm, flat muscular area (free of hair or scars)
  - prophylaxis: 3-6 hrs
  - tolerance risk: wipe off to allow rest period

- tolerance risk  
- need a 10-14 hr rest period  
- allow receptors to recover



### Side effects:

- headache

↳ this can also tell us that the med is working

vasodilation → ↑ ICP → headache

## ③ BP meds

- ACE inhibitors
- ARBs
- B-blockers
- CCBs

## ④ antiplatelets

- aspirin
- Cangrelor
- clopidogrel
- prasugrel
- ticagrelor
- vorapaxar

## ⑤ blood cholesterol ↓

- Omega 3 fatty acid
- statins
- niacin
- bile acid sequestrants
- ezetimibe